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BCStats

Jade Norton
(250) 387-6056
Jade.Norton@gov.bc.ca

November 2009
Issue: 2009-4

Environmental Statistics ◆ November 2009

Food for Thought: How Green is our Diet?

The food that Canadians consume, produce, buy, sell, and even waste plays a significant role in our daily lives, culture and environment. The Canadian food system includes all the products produced and the processes and activities carried out to put food on tables in households and restaurants and to provide goods for trade. As the global population increases, the world's interdependence on energy, water, land and food is taking more precedence in the forefront of the discussion surrounding biological resources and the environment as a whole. Like those in some other parts of the world, Canadians are consuming more calories and spending more money on food than ever before. Canadians represent approximately 0.5% of the earth's population, consume about 0.6% of the world food production and produce nearly 1.5% of the food on the planet. [1]

The food industry is complex and spans numerous sectors and subsectors, overlapping into many industries. Agriculture and fisheries comprise the primary food sector, while the activities involved in food-related manufacturing make up the secondary sector. Food-related services, like transportation, food retail, marketing and food services, contribute to the tertiary sector, which involves the set of activities tied to the service-side of the food system.[2]

The food system in Canada is a big player in the nation's economy. In 2004, the national food system contributed $52 billion to the country's $1.2 trillion gross domestic product (GDP). Similarly, approximately five percent (860,000 individuals) of Canada's workers were employed in some aspect of the food system. These workers include not only farmers and fishers, but also those involved in warehousing, transporting, selling, preparing and serving food and food products. Data used primarily to determine the economic facets of the food system can also be used to provide a glimpse of some of its impacts on the environment.

Food and the Environment

All components of the food system can have implications for the environment. Much of the terrain surrounding agriculture in Canada is highly contested and varying viewpoints are commonplace among farmers, environmental groups, policy makers and the general population as a whole. Obvious environmental impacts include things such as the effects of agri-

[1] The Population Division and the Food & Agriculture Organisation of the United Nations, 2009. As referred to in Statistics Canada, 2009, *Human Activity and the Environment: Annual Statistics*. Catalogue #16-201-XIE

[2] For a more detailed breakdown of the food system and its classifications, see Statistics Canada, 2009, *Human Activity and the Environment: Annual Statistics*, Catalogue #16-201-XIE

cultural activities on surrounding ecosystems, waste, energy use and greenhouse gas emissions (GHGs). However, the concern over the impact of certain practices is not always as simple as they appear to be. For example, fisheries can alter existing aquatic ecosystems through things like the introduction of non-native species and over-fishing. Meanwhile, aquaculture provides an alternative to traditional fisheries and some of the problems that come with it, but can potentially cause new problems such as nutrient pollution from fish waste, the depletion of the natural fish stock to feed farmed fish and the escape of non-native, farmed fish into wild oceans, creating a new threat to the livelihood of wild fish stocks.[3]

As in the case of aquaculture, some agricultural practices can have negative impacts on ecosystems and the environment in general. At the same time, appropriate farmland management can also benefit the habitat of many species of wildlife.[4]

Some key components

Given water's key role as being essential to crop and livestock production, agricultural water usage is one of the most obvious indicators of the environmental impact of farming practices. Water for farming purposes, to the tune of 4.8 billion cubic metres in Canada in 2001, is used most commonly for irrigation of crops, watering livestock, pesticide sprays and washing equipment. Agricultural water use varies from region to region, mostly as a result of Canada's diverse climate conditions and types of crops grown. In 2007, of farmers in BC who irrigated, 62% used water to clean farm buildings and/or equipment, 51% used water to spray pesticides or fertilizers and 39% used water for livestock. Other farm operations that utilize water include harvesting, cooling of produce and processing and packaging products. In that same year, the vast majority (91%) of Canadian irrigators reported using one or more practice(s) to conserve water and energy.[5]

Although land management is vital to increase soil fertility and productivity, the environmental ramification of practices other than water usage, such as those involving tillage, soil erosion, GHG emissions, energy use and the use of pesticides and fertilizers can also have adverse effects.[6]

Many of the steps that are taken to put food on household tables require energy and result in substantive greenhouse gas (GHG) emissions. Fuel is required not only in the agricultural vein, but in all facets of food production for a multitude of activities that contribute to the production of food, such as sowing crops, tilling land, shipping, packaging and processing food goods. Looking at the amount of energy required to produce food shows an interesting dynamic of the environmental impact of the food system.

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[3] For more information on fish stocks in BC, see The Ministry of Agriculture and Lands, *Management of Fish Health in BC:* http://www.agf.gov.bc.ca/ahc/fish_health/fish_health_management.htm

[4] For information on the impacts of agricultural land-use on wildlife see Agri-Food Canada, 2007. The National Agri-Environmental Health Analysis and Reporting Program (NAHARP).

[5] Statistics Canada, Environment Accounts and Statistics Division, 2008.

[6] For information on the impacts of agricultural practices on environmental components, see Statistics Canada's Human Activity and the Environment: Annual Statistics. 2009. Catalogue # 16-201-XIE

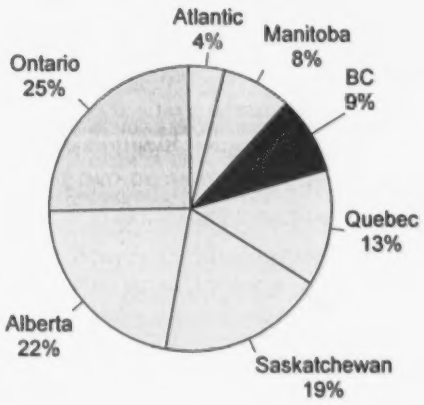
In 2003, Canadians purchased $63.5 billion in food and non-alcoholic beverages from stores, resulting in the indirect and direct[7] production of 45,687 kilotonnes of GHGs, and a usage of 415,177 terajoules of energy. Nearly a quarter (23%) of all food-related GHG emissions in that year were attributable to the production of meat. Animal products involve higher amounts energy use to produce than do prepared foods. Beef and cheese ranked first and second, respectively, for percentage of contributions to both total GHG emissions and total energy use for food commodities.

Distribution of agricultural land

Agricultural activity requires specific soil and climate conditions that are conducive to successful farming. In Canada, it is estimated that a mere five percent of total land area is suitable for long-term annual crop production.[8] Most of this land is used for farming purposes, but some of it has been paved over or built upon. A further 72.4 million hectares are suitable for tame grasslands, which may be used for grazing livestock. Overall, 67.6 million hectares were used for farming purposes in 2006, approximately seven percent of the national land mass. Technically, of the hectares that comprise this farm land, the country is divided into 15 terrestrial ecozones and a further 194 ecoregions, which share common ecological characteristics.[9] Some of these divisions span between parts of two or more provinces, so it is also of interest to compare interprovincial agricultural activity.

In 2006, there were nearly 230,000 farms operating across Canada's 67.6 million hectares of farm land. In that same year, British Columbia was home to nearly 19,850 (2.8 million hectares) of the nation's farms. Nearly three-quarters (73% in 2006) of the province's farms are crop farms. The largest percentage of the nation's farms operated in Ontario (25%), followed by Alberta (22%) and Saskatchewan (19%). The provincial distribution of farm operations in Canada has remained relatively constant in recent years, but has fluctuated in certain provinces. For example, in 1986, BC was home to seven percent of the nation's farms, and by 2006, the share had jumped two full percentage points to nine percent. At the same time, Saskatchewan, Manitoba and Quebec each saw their share of farms slip. Aside from BC, Alberta and Nova Scotia were the only other provinces to increase their share of Canada's farm operations between 1986 and 2006.

Shares of Canadian farms, by province, 2006



Data Source: Statistics Canada

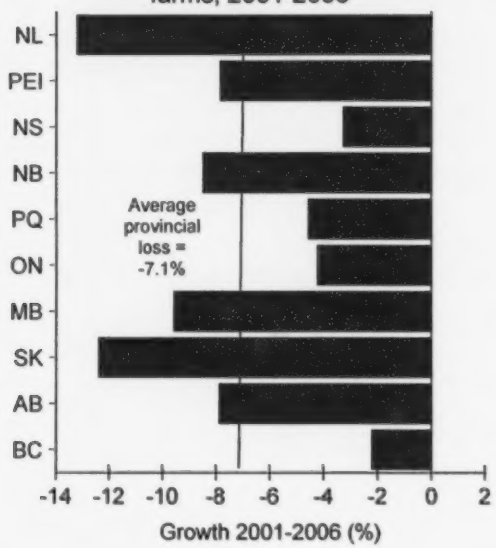
[7] 'Direct' household emissions are the greenhouse gases that are emitted when people drive their vehicles for personal use and use fossil fuels to heat their homes. 'Indirect' household emissions are the greenhouse gases that are emitted when industries produce the goods and services that people purchase for household use.

[8] Canada Land Inventory.

[9] Canadian Council on Ecological Areas.

As is the case in other provinces, BC has seen its number of farms decline significantly over the past five years. For example, in 2001, there were 20,290 farms operating in the province, but by 2006, this number had fallen 2.2% to 19,844. Nationally, the dwindling number of farms often coincides with an increase in the average area of farms, perhaps as a result of smaller farms being bought out by larger operations. This pattern has proven true for BC's farms, with the average farm in 2001 spanning 128 hectares and growing to an average of 143 hectares by 2006.

Every province saw a decline in operating farms, 2001-2006



Source: Statistics Canada

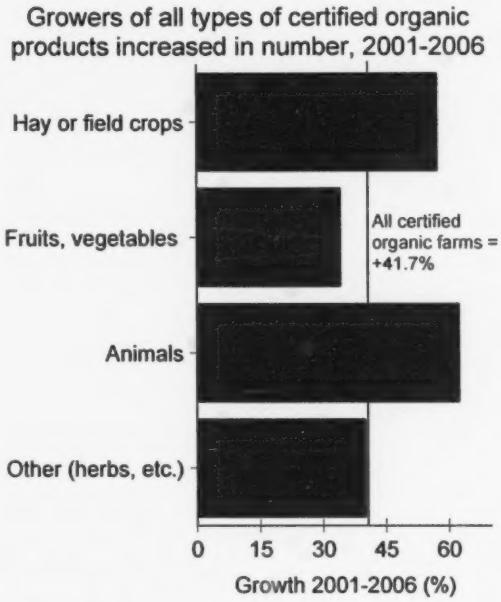
Interestingly, however, BC has not seen the same pattern as the rest of the country in terms of declining numbers of farms over the longer term. In 1986 (19,063 farms reported), the province housed nearly 800 fewer farms than it did twenty years later in 2006 (+4.1% to 19,844 farms). By comparison, the number of farms operating in Canada as a whole declined 21.7% between 1986 and 2006. In fact, BC was the only province to see a rise in the number of operating farms over the twenty-year span. This could perhaps be partly attributable to the upward trend in organic farming in the province.

Organic farming

Despite an overall decline in the number of farms as a whole in recent years, organic farms appear to be on the rise in Canada. Organic farming continues most notably to take root in BC, with proportionally more farms devoted to this method of raising crops and animals than in any other province. According to the 2006 Census, there were 3,232 farms with organic production[10] in British Columbia in that year. This accounted for 16% of all farms in the province, well above the national average of seven percent. Of the 3,232 BC farms reporting organic products in 2006, 86% yielded products that were produced by organic practices, but did not go through formal certification, two percent were in transition to becoming certified and 14% produced certified organic products.[11] The number of farms in the province that produce "certified" organic products has surged in recent years. Between 2001 and 2006, there was a 41.7% increase in the number of BC farms reporting certified organic products. The increase was fuelled by growth in a broad spectrum of farms, with those producing animals or animal products (+62.3%), hay or field crops (+57.1%) and fruits, vegetables and greenhouse products (+34.1%) all recording double-digit jumps.

[10] Organic production refers to "uncertified organic," transitional, or certified organic products.

[11] Note that totals do not add to 100%, as farms can indicate more than one organic status for different products.



Source: Statistics Canada

Due to its climate and large expanses of cropland suited for mechanization, Canada's most common certified organic products are field crops and hay.[12] The second largest certified organic product category is fruit, vegetable and greenhouse products. With almost 80% of all certified organic farms in British Columbia reported growing fruit, vegetable and greenhouse products in 2006, the province had the highest number of certified producers in this category in the nation.[13]

Although farming is a relatively small industry in BC, 13% of Canada's organic farmers were operating in the province in 2006. Saskatchewan was home to one third (1,230) of all organic farms in 2005. Ontario had the most actual acreage being used for organic production (81,974 acres), but with 497 certified farms, accounted for just 14% of the national total. Quebec had 816 certified producers in 2005, representing 23% of organic farmers in Canada, while Alberta (7%), Manitoba (6%) and the Atlantic provinces made up comparatively smaller proportions of Canada's organic farms.

The increasing presence of organic farms in BC and in the rest if the country has undoubtedly contributed to a growing diversity in food availability and has allowed consumers more choice in the types of food they purchase. The demand for certified organic foods is growing across the country. Between 2005 and 2006, Alberta supermarkets had the highest jump in sales of such products (+44%), followed by BC (+34%), Atlantic Canada (+34%), Ontario (+24%) and Quebec (+21%). However, on a per capita basis, demand is by far the greatest in BC. Although the province is home to just 13% of Canada's population, it represents a striking 26% of all Canadian certified organic food sales.[14]

Although organic farming has experienced a notable boost in numbers in recent years, Canadians are still consuming mostly non-organic foods. In 2006, the Organic Agriculture Centre of Canada oversaw a study on sales of certified organic products through traditional mainstream supermarkets. It found that total sales of certified organic food had grown 28% overall from 2005 to 2006, with sales of pre-packaged certified organic goods climbing 31% and fresh products up 22%. Despite this impressive growth, sales of certified organic products accounted for less than 1% of the $46.5 billion Canadians spent in national grocery stores in 2006. That being said, many consumers purchase through farmers' markets, smaller grocery chains, natural food stores, community-supported agriculture and food box deliveries.

[12] Canadian Organic Growers' Association

[13] Statistics Canada, Census of Agriculture, 2006.

[14] Statistics Canada, 2008, *Canadian Agriculture at a Glance*, Catalogue #96-325-XIE

It is estimated that just under 60% of certified organic products are sold through such alternative venues.

What are Canadians eating?

Canadian consumers have come to expect a wide variety of foods available year-round. Amounts of organic foods available for consumption are not available, but regardless of growing practices, Canadians' eating habits reflect the quantity of foods made available for consumer consumption. A visit to the grocery store yields a glimpse of the growing diversity of foods commonly consumed in Canadian households.

According to the 2008 snapshot of food available for consumption, on a per capita basis, Canadians appear to be changing their diets. The average Canadian added more berries (+10.9% from 2007), tea (+9.4%), asparagus (+9.1%), yogurt (+7.6%), processed fruits (+6.6%), wine (+2.6%) and poultry (+1.1%) to their diet in 2008.[15] On the other hand, per capita consumption of red meat (-5.1%), milk (-1.3%) and oils and fats (-1.0%) declined in 2008, continuing their respective downward trends.

From an environmental standpoint, it is interesting that red meat consumption appears to have declined in 2008. This may have been partially the result of fears related to mad cow disease, listeria outbreak or other food issues, or it may have been a conscious choice by consumers to eat less red meat for dietary reasons. Demographic changes also have the potential to affect dietary trends. For example, an ageing population may have different food needs and demands, as might a population that has become more culturally diverse. Regardless of the possible reasons for pattern changes in the average diet, it appears that Canadians are lowering their intake of the foods that are the most taxing on the environment. Red meat and milk are both animal products that fall into the category of foods that use the most energy to produce and simultaneously create the most GHG emissions.

Canadians consumed an average of 79.5 kg of vegetables (both fresh and processed) in 2008, more than a third (36%) of which was potatoes. Lettuce, carrots, onions and tomatoes were the next most popular vegetables. Chinese cabbage, which is fairly new to the Canadian diet, averaged nearly half a kilo per year, about the same as radishes, and nearly triple the consumption of fresh peas.

Canadians ate more fresh fruit last year, averaging 38.8 kg, slightly higher than in 2007 (38.6 kg per person) and up notably from 35.9 kg in 2001. Apples, bananas, oranges and grapes remain the most popular, accounting for nearly half of all fresh fruit eaten, while tropical fruits like pineapples, mangos and papayas continue to make inroads into Canadian diets.

Overall, in 2008, the Canadian total daily intake of calories per person was 2,382, a decline of 131 calories from the peak recorded in 2001.[16] Calorie consumption has remained relatively stable in Canada since its upsurge in the 1990s.

Developing awareness and alternatives

The productive capacity of Canada's farmland is vital to support its population and to con-

[15] Estimates on food availability have been adjusted to account for losses in cooking, storage and waste that occur in homes, restaurants and institutions while preparing and processing food.

[16] Statistics Canada, 2009, *Food Statistics*, Catalogue #21-020-XIE

tribute to global food production. How we farm, what we chose to eat, how we obtain our food and a plethora of other components factor in to the degree to which food production impacts the environment. Food not only plays a crucial role in the national and local economies, but is a necessity that plays an inherent part of everyday life and culture in households across the country. Many organizations in BC aim at developing awareness of the potentially detrimental impact of certain food production activities. Players from all angles ranging from farmers, to consumers, to government have instrumental roles in the development and expansion of more sustainable, healthy agri-food system. BC is home to a wealth of organizations both in the public and private sectors who aim to promote more sustainable agricultural practices and consumer habits.[17]

[17] For an example of developing initiatives, see the Province of BC's *Agriculture Plan* here: http://www.al.gov.bc.ca/Agriculture_Plan/

Table 1

Total number of farms, by province, 1986 to 2006

	1986	1991	1996	2001	2006
Canada	293,089	280,043	276,548	246,923	229,373
NL	651	725	742	643	558
PEI	2,833	2,361	2,217	1,845	1,700
NS	4,283	3,980	4,453	3,923	3,795
NB	3,554	3,252	3,405	3,034	2,776
PQ	41,448	38,076	35,991	32,139	30,675
ON	72,713	68,633	67,520	59,728	57,211
MB	27,336	25,706	24,383	21,071	19,054
SK	63,431	60,840	56,995	50,598	44,329
AB	57,777	57,245	59,007	53,652	49,431
BC	**19,063**	**19,225**	**21,835**	**20,290**	**19,844**

Source: Statistics Canada, Census of Agriculture

Table 2

Farms Classified by certification status of organic products, by province, 2006

	Total farms	Farms producing organic products	Certified organic products	Transitional organic products	Uncertified organic products
	Number of farms reporting				
Canada	229,373	15,511	3,555	640	11,937
NL	558	52	4	1	49
PEI	1,700	80	31	11	49
NS	3,795	359	61	14	294
NB	2,776	239	42	2	196
PQ	30,675	2,323	765	126	1,500
ON	57,211	3,591	593	148	2,989
MB	19,054	809	196	55	600
SK	44,329	2,197	1,181	184	1,088
AB	49,431	2,629	230	26	2,405
BC	**19,844**	**3,232**	**452**	**73**	**2,767**

Source: Statistics Canada, Census of Agriculture

Table 3

Certified organic production by province, 2006 and 2001

	Farms reporting certified organic products		Hay or field crops		Fruit, vegetable or greenhouse products		Animals or animal products		Maple products		Other	
	2006	2001	2006	2001	2006	2001	2006	2001	2006	2001	2006	2001
Canada	3,555	2,230	2,462	1,442	916	614	673	381	299	129	190	211
NL	4	3	0	0	4	3	0	0	0	0	1	1
PEI	31	23	19	11	24	17	4	3	0	0	2	6
NS	61	23	16	6	50	20	12	10	3	0	14	5
NB	42	25	14	6	27	16	8	6	8	4	7	3
PQ	765	372	303	105	208	125	161	53	279	119	42	35
ON	593	405	467	308	174	120	172	120	8	6	34	32
MB	196	90	170	74	21	7	44	17	0	0	3	8
SK	1,181	773	1,170	720	19	18	102	59	1	0	11	46
AB	230	197	193	142	31	21	84	60	0	0	13	30
BC	**452**	**319**	**110**	**70**	**358**	**267**	**86**	**53**	**0**	**0**	**63**	**45**

Source: Statistics Canada, Census of Agriculture

Table 4

BC farms reporting certified organic products, 2001 and 2006

	2001	2006	2001 to 2006	2001	2006
	number		% change	proportion of farms reporting certified organic products(%)	
All farms	20,290	19,844	-2.2	...	...
Farms reporting certified organic products[1]	319	452	41.7	...	...
Type of certified organic product:					
Hay or field crops	70	110	57.1	22	24
Fruits, vegetables or greenhouse products	267	358	34.1	84	79
Animals or animal products	53	86	62.3	17	19
Maple products	0	0	...	...	...
Other (herbs, etc.)	45	63	40.0	14	14

1. The total number of certified organic farms does not equal the sum of the parts because a farm could report more than one category.

Source: Statistics Canada, Census of Agriculture

Table 5
GHG emissions and energy use from spending on food commodities, Canada, 2003

	GHG emissions	Energy used	Contribution to total food	
			GHG emissions	Energy used
	Kilotonnes CO_2	terajoules	percent	
TOTAL	45,686.8	415,177.2	100.0	100.0
Beef	7,063.1	28,180.8	15.5	6.8
Pork	975.9	7,569.4	2.1	1.8
Poultry	2,430.4	22,326.3	5.3	5.4
Fish	1,119.9	15,985.1	2.5	3.9
Cheese	3,507.0	28,847.4	7.7	6.9
Eggs	581.5	4,784.4	1.3	1.2
Fluid milk	2,568.6	19,989.9	5.6	4.8
other	27,440.4	287,494.0	60.1	69.2

Source: Statistics Canada, Environment Accounts